Mapping the NAEP Performance Levels onto the Standard Score Scale of the Iowa Assessments

Joshua Tudor, Shalini Kapoor, Stephen Dunbar, & Catherine Welch
The University of Iowa

Purpose: Translate the NAEP Achievement Levels to the standard score scale of the Iowa Assessments in order to express NAEP Achievement Levels in terms of expected score ranges on the Iowa scale.

Context
• NAEP results are only reported at the state level.
• NAEP results are reported as average scale scores, which makes it difficult to understand the magnitude of differences between states.
• The Iowa Assessments are administered annually to all Iowa students in grades 3 through 8 and 11.
• A representative sample of Iowa’s grade 4 and grade 8 students are selected to take the NAEP math and reading tests every two years.
• The Iowa population and Iowa NAEP sample are being considered randomly equivalent groups for purposes of linking.

Educational Significance
• This research provides a way to report NAEP Achievement Level cut scores on the Iowa standard score scale for individuals.
• This research provides a way to quantify differences between states in terms of raw score units on the Iowa Assessments.

Iowa’s 2003 NAEP results were obtained from the NAEP Data Explorer and the following steps were completed for grades 4 and 8 in both Mathematics and Reading:
1. The Iowa percentile ranks associated with the NAEP achievement level cut scores and the NAEP scale scores associated with the 5 percentiles reported by NAEP were found.
2. The Iowa standard score (ISS) and raw score for each state percentile rank on NAEP was then identified.
3. The national standard score (NSS) associated with each Iowa raw score was found.

Table 1
The Iowa percentile ranks associated with the NAEP achievement level cut scores and the NAEP scale scores associated with the 5 percentiles reported by NAEP were found.

Table 1
Select 2003 NAEP to Iowa Assessment linking relationships
<table>
<thead>
<tr>
<th>Achievement Levels</th>
<th>Grade 4 Reading</th>
<th>Grade 8 Reading</th>
<th>Grade 4 Math</th>
<th>Grade 8 Math</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NAEP</td>
<td>SS</td>
<td>PR</td>
<td>NSS</td>
</tr>
<tr>
<td>Basic</td>
<td>208</td>
<td>30</td>
<td>197</td>
<td></td>
</tr>
<tr>
<td>Proficient</td>
<td>238</td>
<td>65</td>
<td>222</td>
<td></td>
</tr>
<tr>
<td>Advanced</td>
<td>243</td>
<td>21</td>
<td>226</td>
<td></td>
</tr>
</tbody>
</table>

Note: SS = Scale Score, PR = Percentile Rank, NSS = Iowa Standard Score

Table 2
Select 2003 NAEP to Iowa Assessment linking relationships

Table 2
<table>
<thead>
<tr>
<th>Achievement Levels</th>
<th>Grade 4 Reading</th>
<th>Grade 8 Reading</th>
<th>Grade 4 Math</th>
<th>Grade 8 Math</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NAEP</td>
<td>SS</td>
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<td>NSS</td>
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<td></td>
</tr>
</tbody>
</table>

Note: SS = Scale Score, PR = Percentile Rank, NSS = Iowa Standard Score

Table 3
Average number of Iowa items for each NAEP scale score point

<table>
<thead>
<tr>
<th>Content Area</th>
<th>Reading</th>
<th>Math (Total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 4</td>
<td>.23</td>
<td>.42</td>
</tr>
<tr>
<td>Grade 8</td>
<td>.30</td>
<td>.55</td>
</tr>
</tbody>
</table>

Results

• Reporting NAEP Achievement levels as student-level indicators of performance
  • The cut score for proficient on the NAEP grade 4 reading test is 238. The equipercentile equivalent on the reading test of the Iowa Assessments is a standard score of 222 (this linking relationship is depicted by the solid black line in the plot below).
  • As indicated in Table 2, it is estimated that an 8th grade student scoring at or above a standard score of 315 on the math test of the Iowa Assessments would be considered advanced in terms of NAEP performance standards.

• On the average, the number of Iowa Assessment items for each NAEP scale score point can be estimated from this linking procedure.

• In grade 4 reading, the gain made by Massachusetts between 2003 and 2011 is equivalent to 2 items correct on the Iowa Assessment.

• In 2003, the three top performing states on NAEP grade 4 reading were Connecticut, New Hampshire, and Massachusetts. The average reading NAEP scale score for 4th grade public school students in Connecticut, New Hampshire, and Massachusetts was 228 while the average scale score for 4th grade public school students in Iowa was 223. When expressed in terms of raw score units on the Iowa Assessment, this difference of 5 scale score units equates to a difference of 1 raw score point.

• The 2003 achievement gap in grade 8 reading in Iowa between Hispanic and White students is equivalent to 10 items correct on the Iowa Assessment while the 2011 achievement gap corresponds to 7 items correct on the Iowa Assessment.

For further information
Please e-mail Joshua Tudor (joshua.tudor@uiowa.edu) or Shalini Kapoor (shalini.kapoor@uiowa.edu).